Space Weather Forecast

Issued on Sunday, 31 March 2024 at 00:37 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares likely (R1-R2 Blackouts) with chance of Strong flares (R3 Blackouts). Risk decreases through Day 2 (01 Apr).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate with one long duration Moderate-class flare peaking at 30/2116 UTC from the large region that currently straddles the southwest limb. This remains a very large and relatively complex sunspot group. There is now a very restricted viewing angle of the group as it approaches the western limb, but magnetic complexity still remains evident. The other sunspot regions are all small and simple.

There have been a number of Coronal Mass Ejections (CMEs) observed in coronagraph imagery over the past 24 hours, none of which were analysed to be Earth-directed. Two filament disruptions occurred around 30/2300 UTC, one on the northeast of the disc and the other close to centre disc, these are yet to be analysed.

Solar Wind / Geomagnetic Activity: The observed solar wind started the period at slow-ambient levels (around 330 km/s), before increasing from around 30/1300 UTC with the onset of an incoming stream of fast winds from a coronal hole. Wind speeds showed a steeper increase from 30/1729 UTC becoming Slightly Elevated at 30/1847 UTC and are currently around 440 km/s. Interplanetary Magnetic Field, Bt, has been on an increasing trend, rising to Moderate around 30/1300 UTC. The important north-south component, Bz, fluctuated moderately but largely remained oriented northwards. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) continued to be at or very slightly above background and well below Radiation Storm levels. This is due to the declining effects of the Moderate Radiation Storm that peaked on 24 Mar.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity at first, with a slight chance of an isolated Strong flare from the large sunspot region that lies on the southwest limb. This region is expected to depart the disc later Day 1 (31 Mar) with flare risks reducing significantly. However, any notable Strong flares may remain observable into Day 3 (01 Apr). Then activity is expected to be Low.

Solar Wind / Geomagnetic Activity: There are no Earth-directed Coronal Mass Ejections (CMEs) expected during the forecast period. Solar wind are exhibiting signs of enhancement due to the arrival of a stream of fast winds from a coronal hole. Winds are expected to remain at Slightly Elevated levels Days 1-2 (31 Mar-01 Apr), perhaps peaking at Elevated levels before easing later Day 2 and Day 3 (02 Apr). The arrival of further fast winds associated with coronal holes is expected later Day 3, or more probably into Day 4 (03 Apr), with speeds likely to return to Slightly Elevated or Elevated levels.

Geomagnetic activity is expected to be mainly Quiet (Kp 0-2) but with a chance of Unsettled (Kp 3) or Active (Kp 4) intervals Day 1 and again from later Day 3 (02 Apr).

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Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to be near background levels, with a slight chance of a further enhancement above the S1/Minor Radiation storm level given any notable flares from the large sunspot on the southwest limb. This risk lowers significantly by Day 3 (02 Apr).

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	30	20	20
Very Active	R3 to R5 X	No	20	5	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	5	5
Very Active	≥ S3 *	No	5	5	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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